A New Fuzzy Logic Controller Based IPM Synchronous Motor Drive

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Summary

This paper presents a novel fuzzy logic controller (FLC) scheme for speed control of an interior permanent magnet synchronous motor (IPMSM) drive. The proposed FLC is designed to have less computational burden, which makes it suitable for online implementation. The FLC parameters are optimized by genetic algorithm. The complete vector control scheme incorporating the FLC is successfully implemented in real-time using a digital signal processor board DS 1102 for a laboratory 1 hp interior permanent magnet (IPM) motor. The efficacy of the proposed FLC based IPMSM drive is verified by simulation as well as experimental results at different dynamic operating conditions such as sudden load change, parameter variations, step change of command speed, etc. The proposed fuzzy logic controller is found to be a robust controller for application in IPMSM drive.